

3.17 PALEONTOLOGICAL RESOURCES

This section provides an overview of the paleontological resources in the project area. Specifically, this section describes the area of analysis and the regulatory setting, defines paleontological resources, and describes the inventory methods. This section also analyzes potential project impacts and mitigation measures.

3.17.1 AREA OF ANALYSIS AND METHODOLOGY

A paleontological characterization report completed for the project (Firby 1999) encompassed a 500-foot wide study corridor along 345 miles of the route alternatives. Paleontological resources are fossilized remains of multicellular invertebrate and vertebrate animals and multicellular plants, including imprints thereof (36 CFR 261.2). Fossilized remains are any non-manufactured evidence of prehistoric life, including skeletal remains, impressions of these remains, or their chemical signatures (personal communication with Dr. James Firby, April 11, 2000). The significance of paleontological resources is subjectively ranked based on the presumed scientific value of proven fossil content. For example, vertebrate fossils are typically both less common and less abundant than invertebrate fossils, and are usually (but not always) rated as more significant. Exceptions are common, however, as in the case of well-preserved soft-bodied organisms such as worms, insects, and spiders, or in the case of rare invertebrate fossils, which have a unique occurrence.

METHODOLOGY

A summary of the inventory methods related paleontological resources in the study corridor and surrounding region is provided below. The inventory methods are organized in terms of literature searches and field surveys, as described below.

Literature Search

Existing literature on the geology and paleontology of the project area was reviewed for the existence of known fossils or areas with high potential for the existence of fossils based on geologic conditions. Prime sources used in the literature review were computerized databases such as GEOREF, which include articles in scientific journals as recent as the last 6 months, as well as the investigators' personal knowledge of the area's literature accumulated over a combined 70 years of experience. Locality databases from institutions such as the Keck Museum of the Mackay School of Mines, University of Nevada Reno, University of California Museum of Paleontology, and published localities of the USGS were consulted as necessary. Areas with high and moderate paleontological potential were then ranked for significance. The ranking of significance potential was based on the experience of the evaluating paleontologist with the type of geologic deposit, familiarity with the specific deposit, and the literature referring to that deposit.

Field Survey

Geologic formations in the study corridor with moderate to high paleontological potential and significance were examined in the field from July 19 through July 23, 1999 by Dr. James Firby. The field survey also confirmed the existence of certain important geological units.

REGULATORY FRAMEWORK

Code of Federal Regulations

The BLM manages paleontological resources under a number of federal regulations. Principally, paleontological resources on BLM lands are protected under Title 43, Subpart 8365.1-5 of the Code of Federal Regulations, which prohibits the willful disturbance, removal, and destruction of scientific resources or natural objects. Subpart 8360.0-7 identifies the penalties for such violations.

Federal Land Policy and Management Act

In addition, the Federal Land Policy and Management Act of 1976 (P.L. 94-579) requires that the public lands be managed in a manner that protects the "... scientific qualities ..." and other values of resources under BLM management.

The BLM has a Paleontological Resource Management Program which is intended to provide a consistent and comprehensive approach to the management of paleontological resources including identification, evaluation, protection, and use. This program is described in the BLM Manual 8720 (BLM 1998). The specific objectives of this program are to:

- Locate, evaluate, manage, and protect, where appropriate, paleontological resources on public lands.
- Facilitate the appropriate scientific, educational, and recreational uses of paleontological resources, such as research and interpretation.
- Ensure that proposed land uses, initiated or authorized by BLM, do not inadvertently damage or destroy important paleontological resources on public lands.
- Foster public awareness and appreciation of our nation's rich paleontological heritage.

Paleontological resources found on public lands are recognized by the BLM as constituting a fragile and nonrenewable scientific record of the history of life on earth, and so represent an important and critical component of America's natural heritage. It is the BLM's policy, therefore, to manage paleontological resources for these values, and to mitigate adverse impacts to them (BLM 1998).

3.17.2 AFFECTED ENVIRONMENT

The setting for paleontological resources is defined by the geologic setting of a given area through geologic time. These geologic units are also called "lithostratigraphic units," which are rock formations, beds, groups, and informal units assigned to a stratigraphic horizon and lithotype. Lithostratigraphic units in the study corridor that would be crossed by the project right-of-way, or are close enough to the surface to be potentially disturbed by construction activities, are listed in Table 3.17-1, along with a ranking of paleontological potential and significance. Additional information regarding each unit is available in the paleontological characterization report (Firby 1999).

As shown in Table 3.17-1, only the Undivided Quaternary and Late Tertiary sediments (Qtsu) in the project area contain both high paleontological potential and significance. Undivided Quaternary and Late Tertiary sediments are variously assigned to the Carlin and Hay Ranch formations located primarily in Pine Valley. This formation is primarily made of sandstone, vitric tuff, limestone, and siltstone.

The Hay Ranch Formation is equivalent to the Humboldt Formation, and is used here as a lateral equivalent. The Hay Ranch (Humboldt) Formation is known to contain fossil mammals, plants, and invertebrates. Wherever encountered, Qtsu must be considered to have a high degree of both potential

and significance for paleontological resources (Firby 1999). This formation occurrence in the study corridor is shown in [Figure 3.17-1](#).

TABLE 3.17-1: GEOLOGIC FORMATIONS IN THE PROJECT AREA RANKED BY PALEONTOLOGICAL POTENTIAL AND SIGNIFICANCE

Formation Name and Scientific Abbreviation	Paleontological Potential	Significance Potential
Quaternary and Tertiary Units (65 million years ago to present day)		
Playa deposits (Qp)	Low	Low
Quaternary alluvium (Qa, Qs, Qal)	Low	Low
Older Quaternary sediments (Qoa)	Low	Low
Undivided Quaternary and Late Tertiary sediments (Qtsu)	High	High
Tertiary gravels (Tg)	Low	Low
Undifferentiated younger sediments (Tys)	Moderate	High
Undivided Tertiary Volcanic Rocks (Tvu)	Low	Low
Tertiary andesite and basalt (Ta2)	Low	Low
Mesozoic Units (65 million – 200 million years ago)		
Newark Canyon Formation (Kn)	Low	Low
Jurassic and Cretaceous volcanic rocks (KJv)	Low	Low
Jurassic granites (Jg)	Low	Low
Paleozoic Units (200 million - 500 million years ago)		
Garden Valley Formation (Pg)	Moderate	Low
Riepe Spring Formation (PIP)	Moderate	Low
Diamond Peak Formation (IPMdp, Md)	Moderate	Low
Mississippian Chainman Shale (Mc, MD)	Moderate	Low
Undivided Mississippian sedimentary rocks (Mu)	Low	Low
Devonian (Dd, Dn, Dl)	Moderate	Low
Middle to Upper Devonian Slaven Chert (Ds)	Low	Low
Early and Middle Ordovician rocks (Ovi, Ov)	Moderate	Low

Source: Firby 1999.

Paleontological Resources Survey Results

A review of the literature and fossil databases did not reveal any recorded fossil localities within the project area. Lithostratigraphic units within the project area range in age from Quaternary to Middle Ordovician. While most of the older units are known to contain fossils, those resources are not believed to have a high degree of significance, except for the Hay Ranch (Humboldt) Formation, which is known to contain significant fossil mammals, invertebrates, and plants. The Hay Ranch (Humboldt) Formation would be crossed by Segments B, C, D, and E. This unit, rated as high for both paleontological potential and significance, was examined in the field as part of this investigation. While no fossils were found during this examination in 1999, there exists the potential for fossils to be discovered during the course of construction. For example, a BLM archaeologist discovered fossilized vertebra of a large mammal at the western end of Segment E in fall 2000.

**FIGURE 3.17-1: GEOLOGICAL FORMATIONS POTENTIALLY CONTAINING SIGNIFICANT
PALEONTOLOGICAL RESOURCES**

3.17.3 ENVIRONMENTAL CONSEQUENCES

This section describes the potential direct and indirect impacts of the project on significant paleontological resources, as well as mitigation measures to reduce or eliminate these potential impacts.

SIGNIFICANCE CRITERIA

Project construction and operation activities would have a significant impact on paleontological resources if they would:

Substantially compromise a significant paleontological site's scientific and educational values.

IMPACTS COMMON TO ALL ROUTE ALTERNATIVES

Potential for the discovery of significant paleontological resources is high where all route alternatives would cross Undivided Quaternary and Late Tertiary Sediments (Qtsu), also known as Hay Ranch Formation (see [Figure 3.17-1](#)). Disturbance of the surface of the Hay Ranch Formation could possibly damage subsurface fossils that may be present. Portions of Segments B, C, D, and E specifically cross the Hay Ranch Formation.

☐ **Impact Paleontological-1: Potential Discovery of Significant Paleontological Resources**

Subsurface excavation along the portions of Segments B, C, D, and E, which cross the Hay Ranch Formation, may adversely affect significant paleontological resources if present in the construction area.

☐ **Mitigation Measure Paleontological-1**

The portions of Segments B, C, D, and E that cross the Hay Ranch Formation shall be: (1) monitored during construction by a paleontologist who meets Nevada BLM qualifications; (2) if paleontological resources are discovered during construction, the BLM would be notified immediately and measures taken to protect the resource. A buffer of 50 meters would be left around any discovery and work would not resume until authorization was given by an authorized officer. The significance of the resource would be evaluated and whether or not avoidance was possible. Stabilization and measures to mitigate construction damage might also be required even if avoidance is possible. Should avoidance prove unfeasible, further mitigation procedures to protect the resource would be determined by the BLM.

Summary Comparison of Route Alternatives

TABLE 3.17-2: SUMMARY OF IMPACTS BY ROUTE ALTERNATIVE

Impact	Crescent Valley (a)	Crescent Valley (b)	Pine Valley (a)	Pine Valley (b)	Buck Mountain
Impact Paleontological-1: Potential Discovery of Significant Paleontological Resources	X	X	X	X	X

RESIDUAL IMPACTS

After mitigation, there may be minor residual impacts to paleontological resources, depending on the selected route alternative and the number of eligible sites in the path of that route. After selection of the

preferred route and final design (i.e., tower placement, centerline route, etc.), the residual impacts to paleontological resources will be more clear.

As mentioned above, a detailed COM Plan would be completed after the selection of the preferred alternative, providing site-specific mitigation measures for those resources potentially affected by the construction, operation, and maintenance of the project. The COM Plan would also contain monitoring protocols to ensure compliance with the mitigation measures.

NO ACTION ALTERNATIVE

Under the No Action Alternative, impacts to paleontological resources associated with the project would be avoided. However, paleontological resource impacts could occur in other areas as SPPC and the Nevada PUC would begin emergency planning efforts to pursue other transmission and/or generation projects to meet the projected energy shortfall.